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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/600,935	06/20/2003	Masud Mansuripur	UA 02-023	6190

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HAYES, SOLOWAY P.C.  
3450 E. SUNRISE DRIVE, SUITE 140  
TUCSON, AZ 85718

EXAMINER

NEGIN, RUSSELL SCOTT

ART UNIT PAPER NUMBER

1631

DATE MAILED: 10/17/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/600,935	<b>Applicant(s)</b> MANSURIPUR ET AL.	
	<b>Examiner</b> Russell S. Negin	<b>Art Unit</b> 1631	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 1 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-80 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☐ Claim(s) \_\_\_\_ is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☒ Claim(s) 1-80 are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |  |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                               | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                      | 5) <input type="checkbox"/> Notice of Informal Patent Application                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date ____ | 6) <input type="checkbox"/> Other: ____  |

## DETAILED ACTION

### *Election/Restrictions*

Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 1-41 and 66-73, drawn to a storage device comprising a write head that encodes strands, a storage block for the strands, a read head for reading data on the strands, and a transport mechanism that moves between them, classified in class 702, subclass 19. If this group is elected, then the below mentioned species elections apply.
- II. Claim 42, drawn to a method of fabricating a storage device by patterning and processing wafers, classified in class 702, subclass 19.
- III. Claims 43-65 and 74-80, drawn to a method of storing and retrieving a sequence of binary data, classified in class 702, subclass 19. If this group is elected, then the below species elections apply.

The inventions are distinct, each from the other because of the following reasons:

Inventions II and I are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make another and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case, a materially different process can make the product. For example, the process of making a hypothetical enzymatic Turing machine as shown in page 55 of Bennett et al [Scientific American, July 1985, pages 48-56], is

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another method of making the same storage device described in claim 1. Thus, there is undue search burden in searching the divergent subject matter of the storage device and a method for its fabrication.

Inventions III and I are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another and materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case the apparatus as claimed can be used to practice another and materially different process. For instance, the storage device can be used as an enzymatic Turing machine as described in page 55 of Bennett et al [Scientific American, July 1985, pages 48-56]. Since this apparatus can be used for a materially different process than the one described by the method, it is undue burden to search both the process and apparatus.

Inventions II and III are directed to related processes. The related inventions are distinct if the (1) the inventions as claimed are either not capable of use together or can have a materially different design, mode of operation, function, or effect; (2) the inventions do not overlap in scope, i.e., are mutually exclusive; and (3) the inventions as claimed are not obvious variants. See MPEP § 806.05(j). In the instant case, the inventions as claimed the inventions have different functions and do not overlap in scope. In the instant case, Invention II is a method of making a storage device while Invention III is a method of using a storage device. Since the storage device conforms to other methods of fabrication and usage, the two inventions are distinct. Furthermore,

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the inventions as claimed do not encompass overlapping subject matter and there is nothing of record to show them to be obvious variants. There would be undue burden in searching the fabrication and use of the apparatus.

***Species Elections for Invention I***

There are three (3) species elections for Invention I for which the applicant must make one election for each category.

Category A: probe apparatus

Specie A-1: the microscopic probe comprises a scanning tunneling microscope tip (claim 5)

Specie A-2: the microscopic probe comprises an atomic force microscope tip (claim 6)

Justification:: A scanning tunneling microscope is physically distinct from an atomic force microscope tip. Searching both requires an undue burden.

Category B: DNA vs. RNA

Specie B-1: the molecular material is DNA (claims 28-29)

Specie B-2: the molecular material is RNA (claim 30)

Justification: DNA is physically distinct from RNA; each has its own chemical properties. They are distinct and require an undue search burden.

Category C: storage device composition

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Specie C-1: the storage device is comprised of a series of parking lots and race tracks in addition to the write head, read head and transport mechanism of claim 1 (claims 31).

Specie C-2: the storage device is comprised of patterned substrates with microfluidic valves (claim 32-41)

Justification: The configuration of the two types of storage devices have two distinct configurations making them distinct inventions with an undue search burden.

***Species Elections for Invention III:***

If this Invention is chosen, applicant must elect one specie from each of the three below mentioned Categories:

Category D: strand reading methods

Specie D-1: the strand is read by applying a voltage across the membrane having a nano-pore formed therein thereby creating an ionic current (claim 55)

Specie D-2: the strand is read by passing it by a microscopic probe that detects the base or collection of bases (claim 56)

Justification: The two methods of reading the strand are distinct in that each requires its own method steps (i.e. applying a voltage differential vs. passing it by a microscopic probe).

Category E: strand disposal

Specie E-1: after the strand is read, it is destroyed (claim 57)

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Specie E-2: after the strand is read, it is broken into its constituent molecules and recycled (claim 58)

Specie E-3: after the strand is read, it is returned to the memory address (claim 59)

Justification: Each method of disposing, recycling, or returning of the strand is unique and distinct requiring a different search.

Category F: movement of strands

Specie F-1: the strands are moved by charging the strands and using an electric field gradient to pull them (claim 60)

Specie F-2: the strands are moved by forming optical tweezers that grab the strands and pull them around (claim 61)

Specie F-3: the strands are moved by pumping and thereby inducing a flow current in the liquid filled canals that move the strands (claim 62)

Justification: Each method of moving the strands (i.e. by charging, using tweezers, or using a flow current) is unique and with its own method steps and search burden.

Currently, claims 1-4, 7-27, and 66-73 are generic to Invention I while claims 43-54, 63-65, and 74-80 are generic to Invention III.

Applicant is advised that a reply to this requirement must include an identification of the species that is elected consonant with this requirement, and a listing of all claims readable thereon, including any claims subsequently added. An argument that a claim

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is allowable or that all claims are generic is considered nonresponsive unless accompanied by an election.

Upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which depend from or otherwise require all the limitations of an allowable generic claim as provided by 37 CFR 1.141. If claims are added after the election, applicant must indicate which are readable upon the elected species. MPEP § 809.02(a).

Because these inventions are independent or distinct for the reasons given above and there would be a serious burden on the examiner if restriction is not required because the inventions have acquired a separate status in the art due to their recognized divergent subject matter, restriction for examination purposes as indicated is proper.

Applicant is advised that the reply to this requirement to be complete must include (i) an election of a species or invention to be examined even though the requirement be traversed (37 CFR 1.143) and (ii) identification of the claims encompassing the elected invention.

The election of an invention or species may be made with or without traverse. To reserve a right to petition, the election must be made with traverse. If the reply does not distinctly and specifically point out supposed errors in the restriction requirement, the election shall be treated as an election without traverse.

Should applicant traverse on the ground that the inventions or species are not patentably distinct, applicant should submit evidence or identify such evidence now of



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record showing the inventions or species to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other invention.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Papers related to this application may be submitted to Technical Center 1600 by facsimile transmission. Papers should be faxed to Technical Center 1600 via the central PTO Fax Center. The faxing of such pages must conform with the notices published in the Official Gazette, 1096 OG 30 (November 15, 1988), 1156 OG 61 (November 16, 1993), and 1157 OG 94 (December 28, 1993) (See 37 CFR § 1.6(d)). The Central PTO Fax Center Number is (571) 273-8300.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Russell Negin, Ph.D., whose telephone number is (571) 272-1083. The examiner can normally be reached on Monday-Friday from 7am to 4pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's Supervisor, Andrew Wang, Supervisory Patent Examiner, can be reached at (571) 272-0811.

Any inquiry of a general nature or relating to the status of this application should be directed to Legal Instrument Examiner, Yolanda Chadwick, whose telephone number is (571) 272-0514.

Information regarding the status of the application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information on the PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

*Rm*

8 October 2006

*John S. Brusca 10 October 2006*  
JOHN S. BRUSCA, PH.D.  
PRIMARY EXAMINER